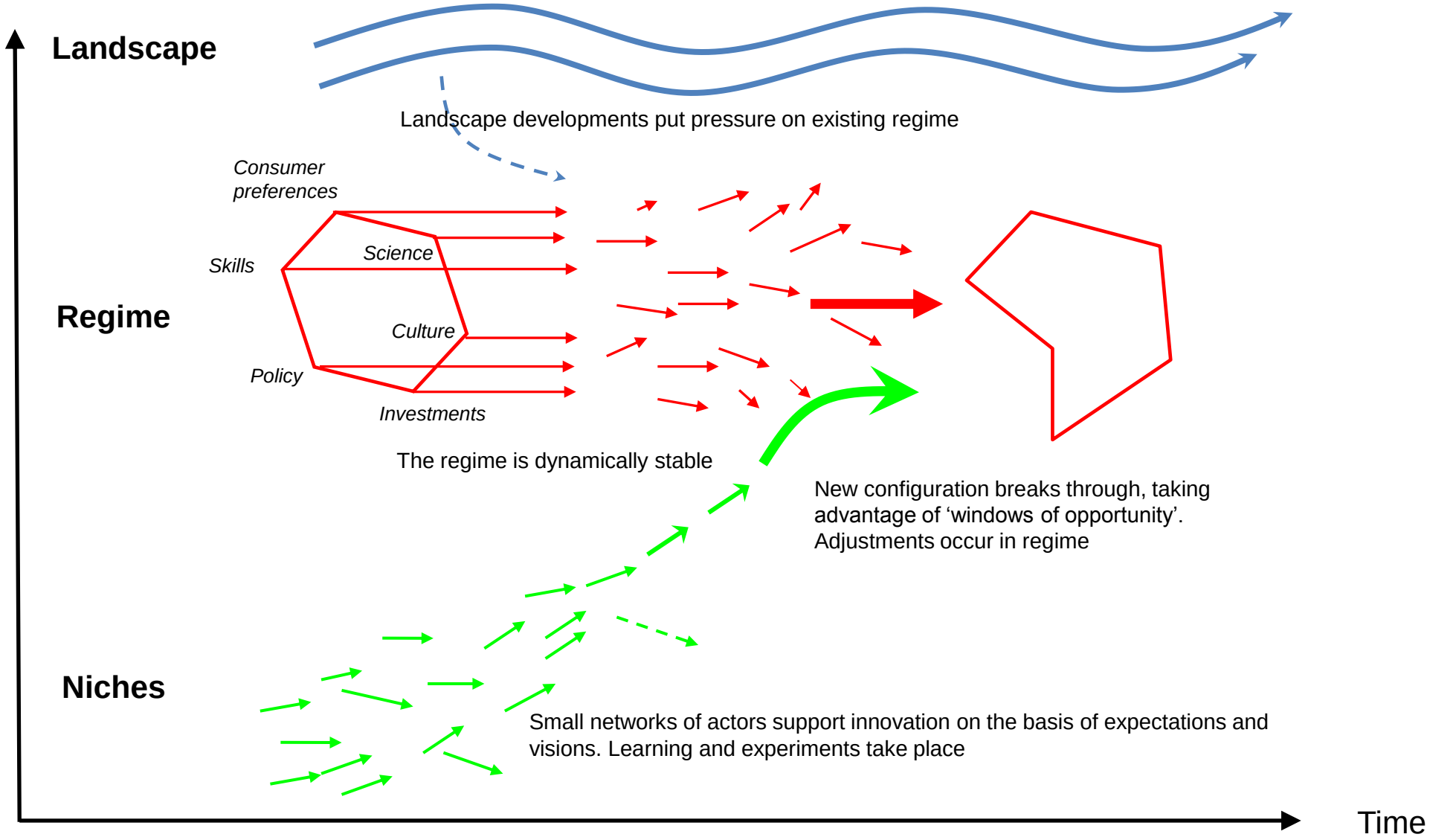
Transitions towards sustainable mobility

Michael Asquith, European Environment Agency, 6 March 2017

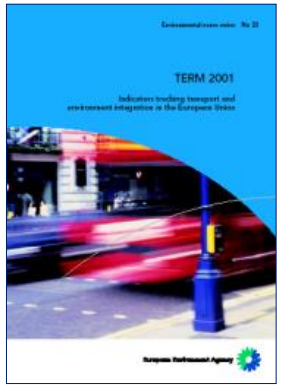
What this presentation is about

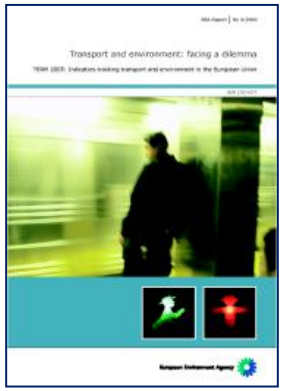
- TERM 2016: *Transitions towards a more sustainable mobility system*
- Introduce sustainability transitions concepts using some examples from the transport domain
- Provide a bit of context for subsequent discussions

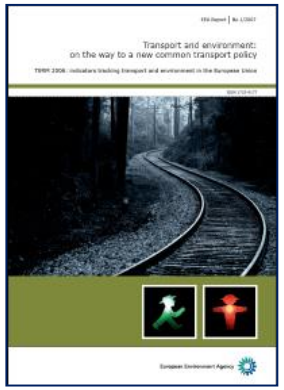
The multi-level perspective on transitions: rather confusing

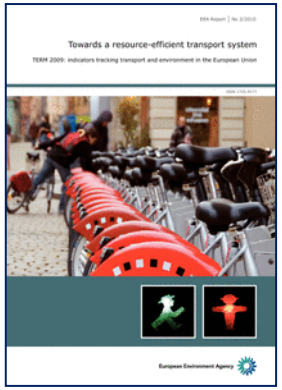


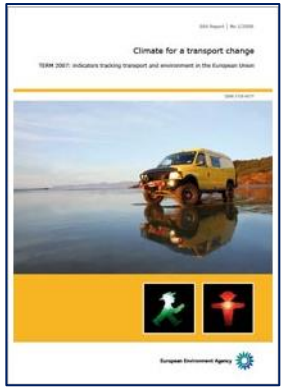
Annual TERM report: since the year 2000

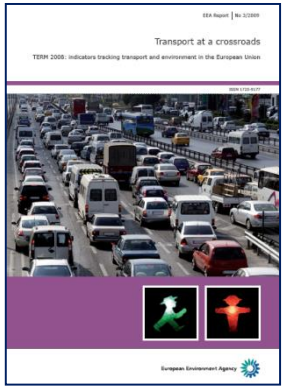


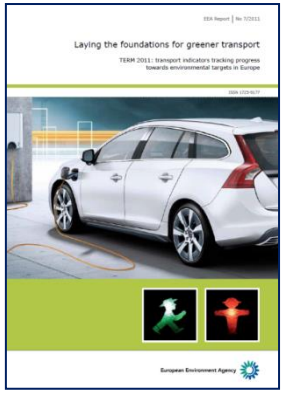


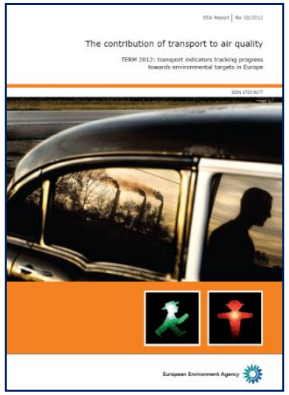


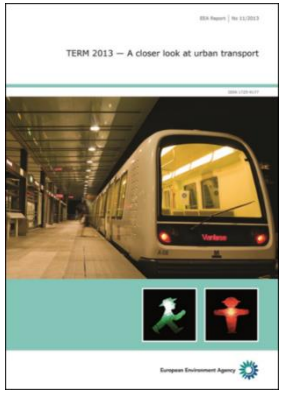


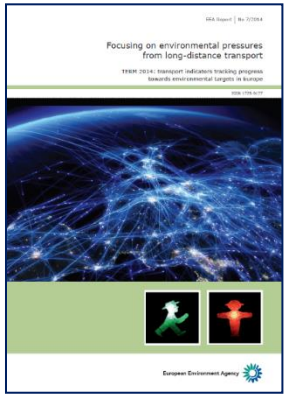


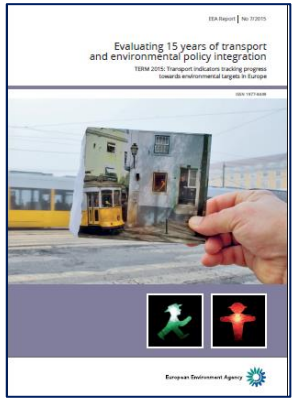








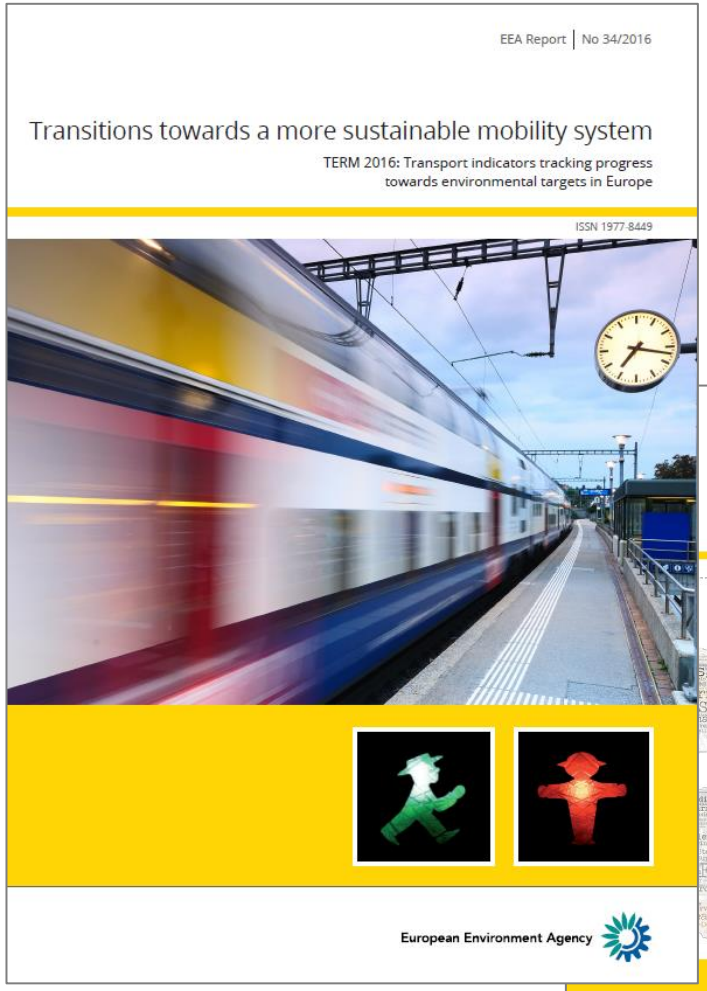


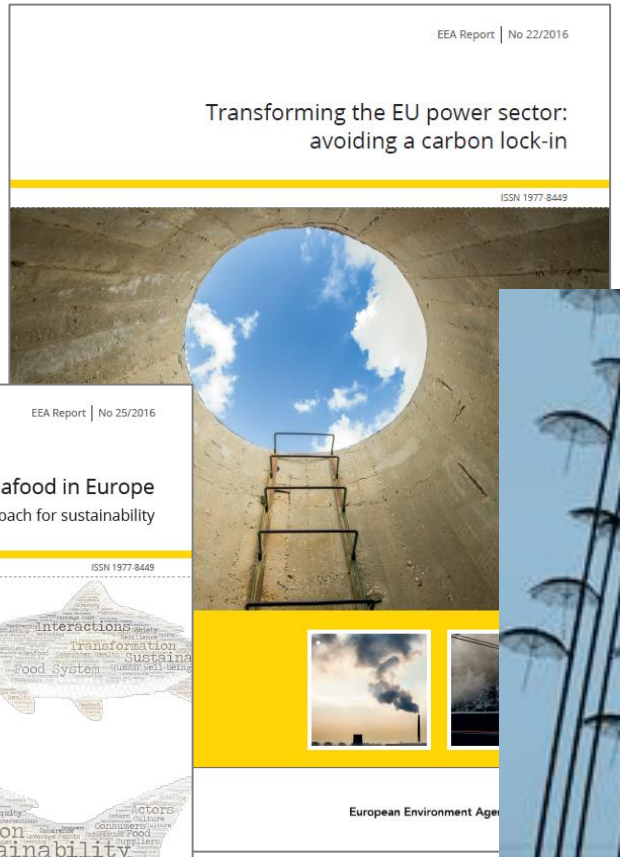


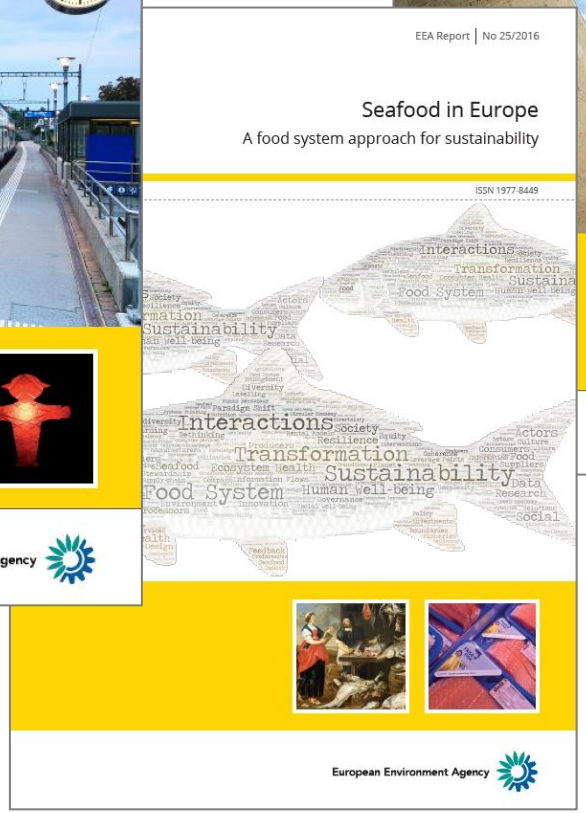
TERM 2015 evaluated 15 years of transport and environmental policy integration

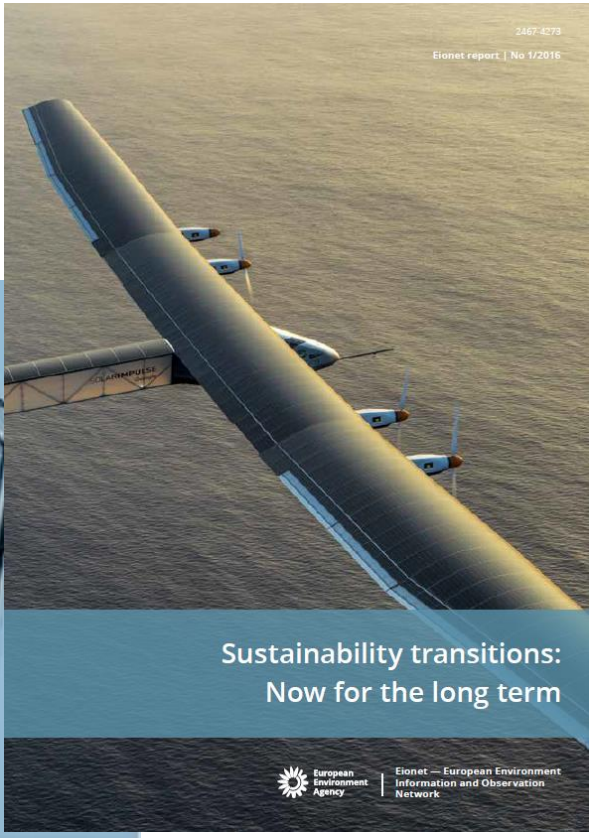
TERM 2016 looks ahead to Europe's long-term sustainability goals

EEA publications exploring systems, megatrends, transitions









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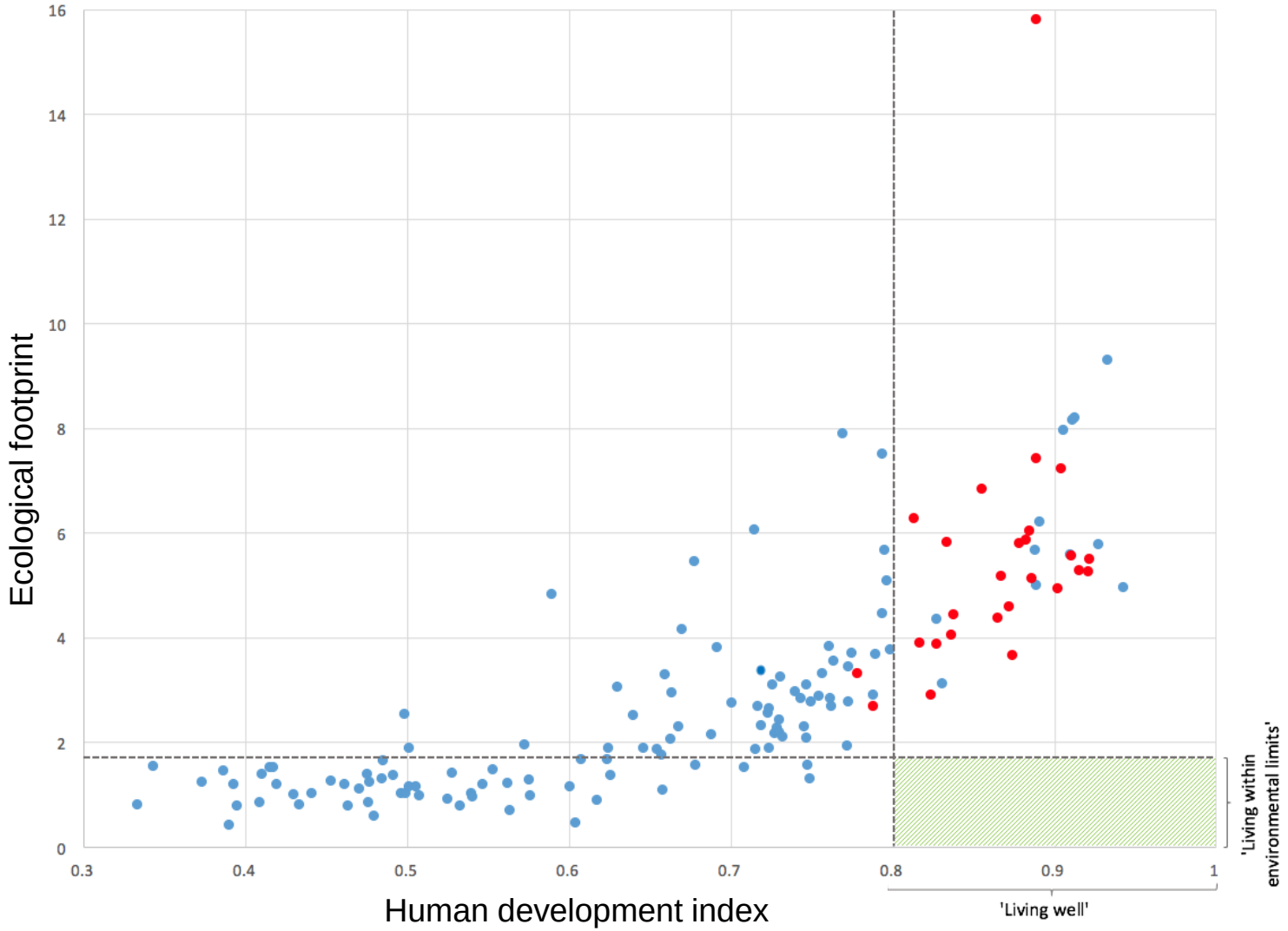
SOER 2015 concluded on the need for transitions

Incremental efficiency gains to established technologies will not be sufficient.

Living well within environmental limits will require fundamental transitions in core societal systems, including food, energy, mobility, urban, fiscal and finance systems.

This will necessitate profound changes in dominant practices, policies and thinking.

Why do we need systemic transitions?



First, because global trends necessitate huge improvements in environmental performance in advanced economies

Source: UNDP and Global Footprint Network

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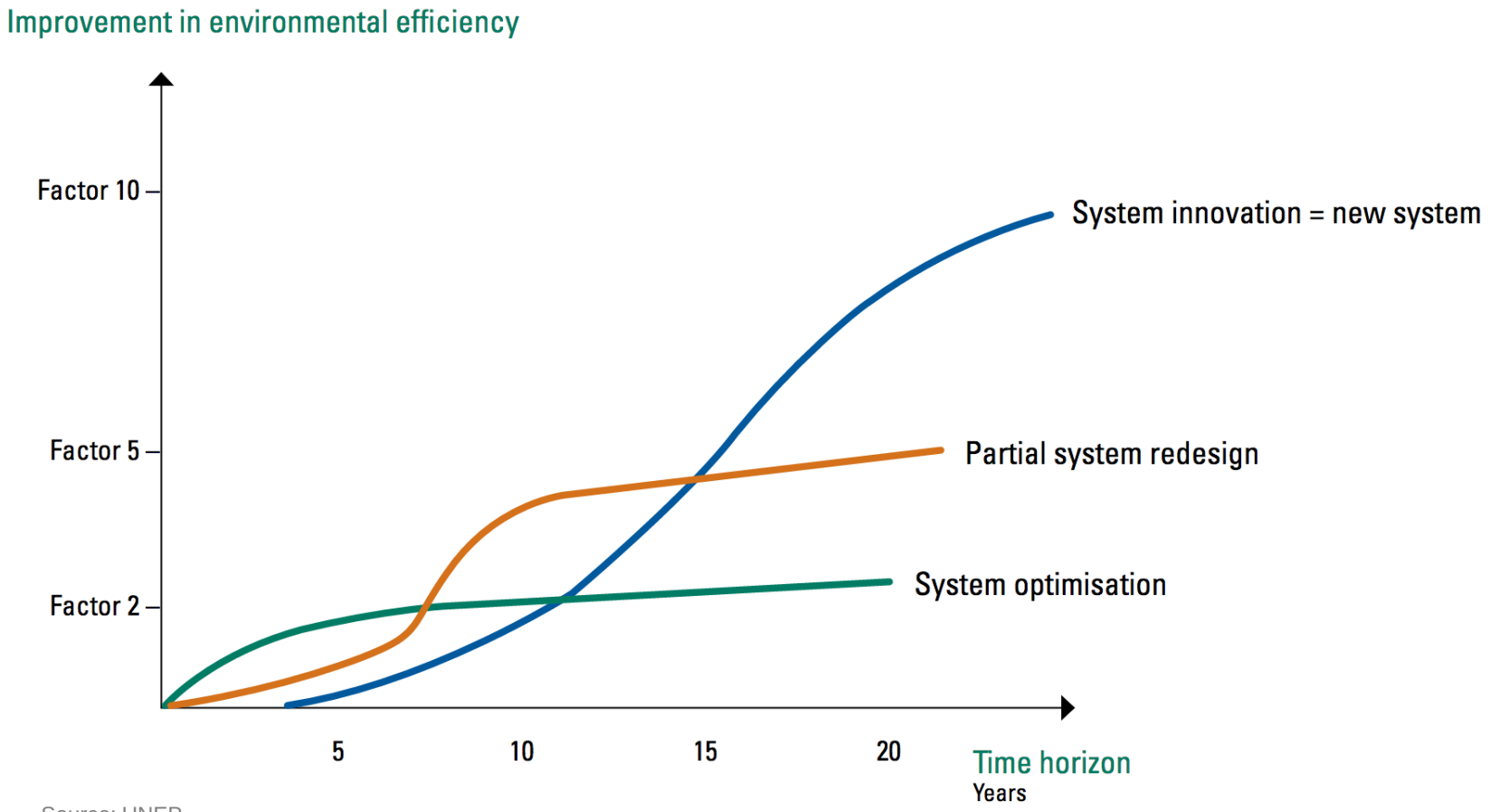
Why do we need systemic transitions?

The scale of needed change necessitates system innovation



Source: UNEP

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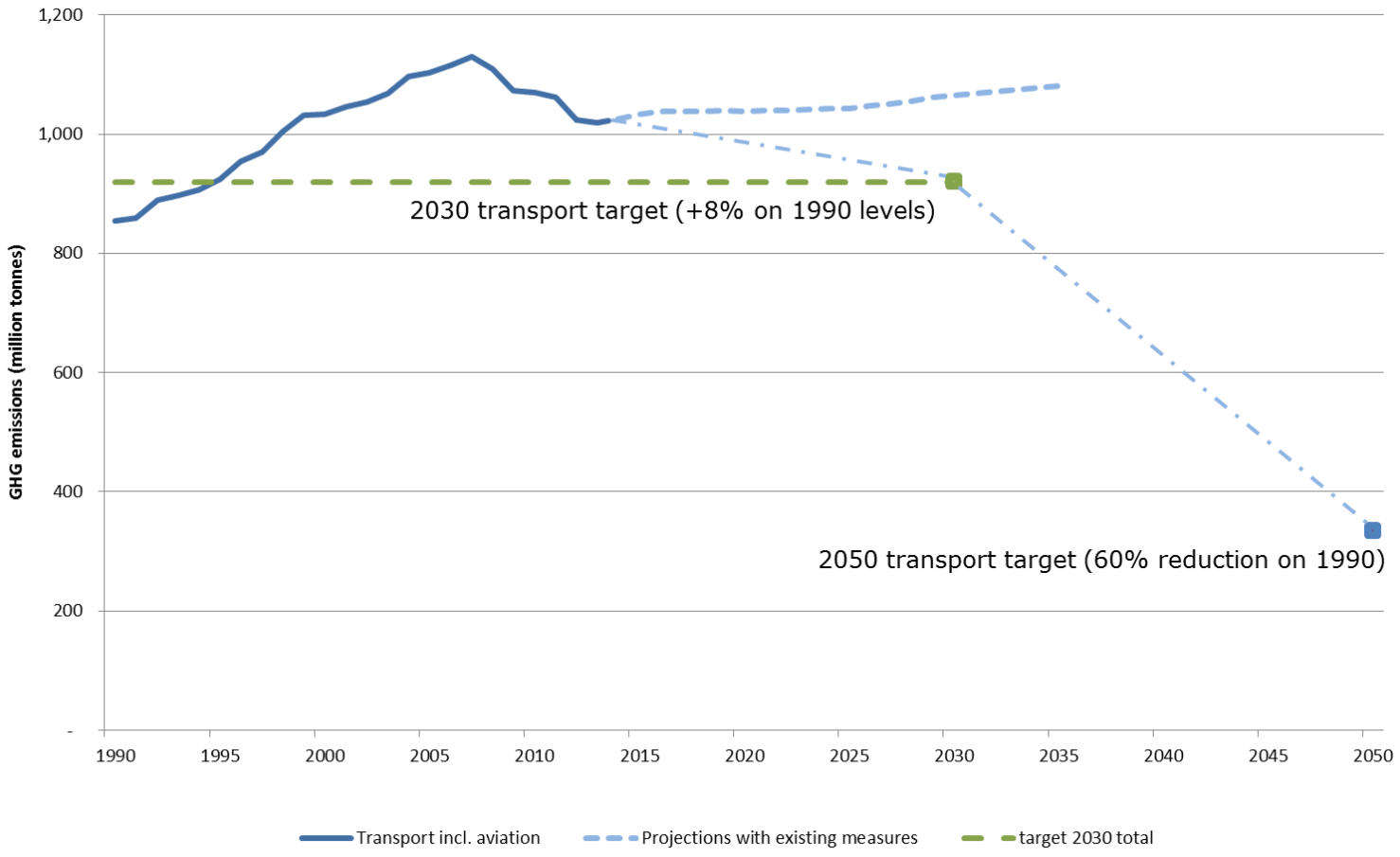
The challenge is particularly obvious for transport



Transport GHG emissions fell between 2008 and 2013, but rose in 2014.

They will have to fall by 67% by 2050 to meet the EU's 60% target

But projections with existing measures point to an increase

Source: EEA, 2016. UNFCCC and the EU Greenhouse Gas Monitoring Mechanism (EU Member States).

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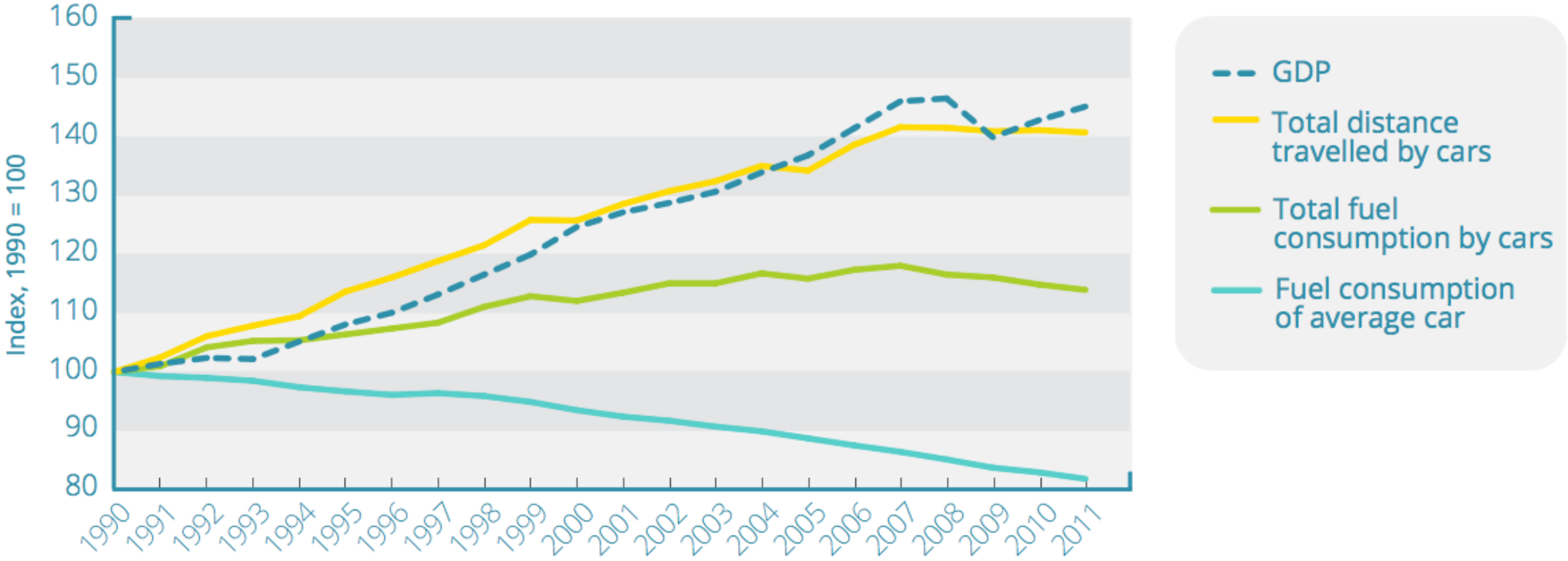
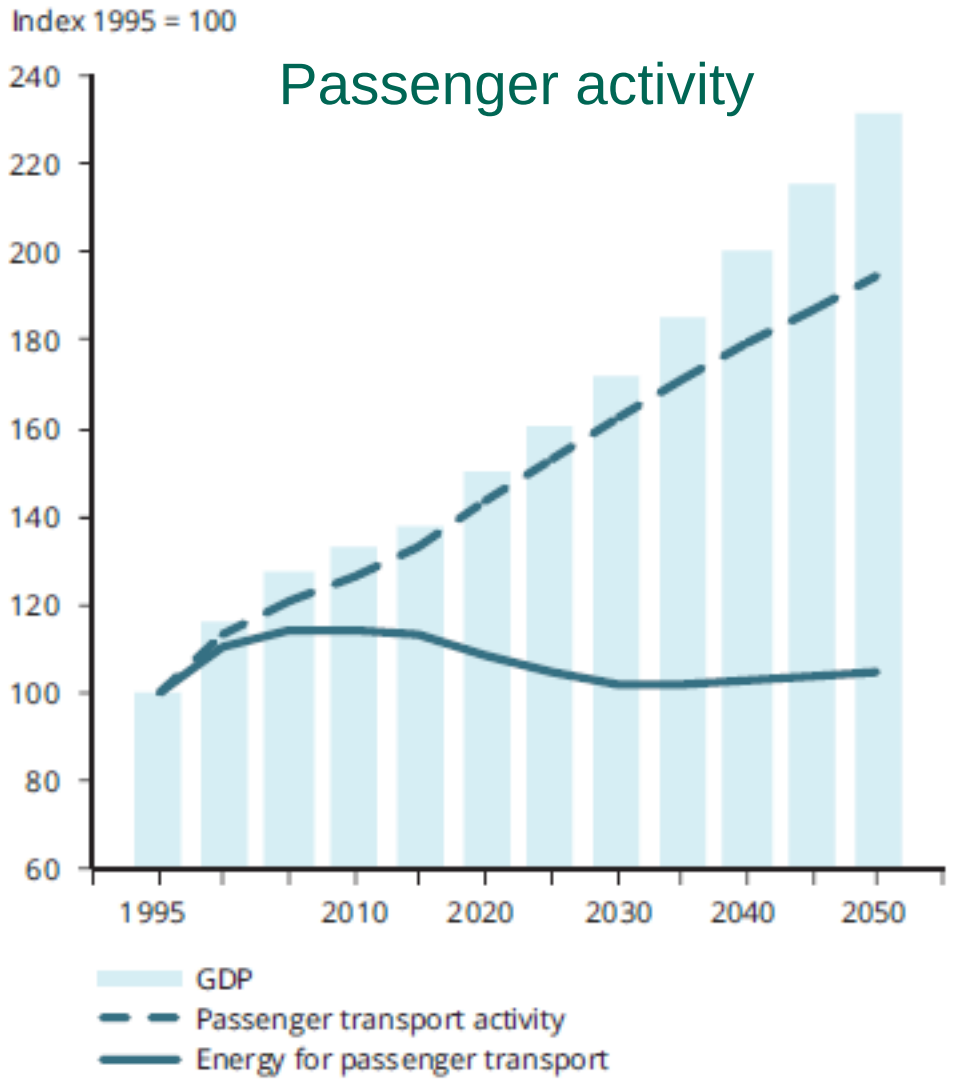
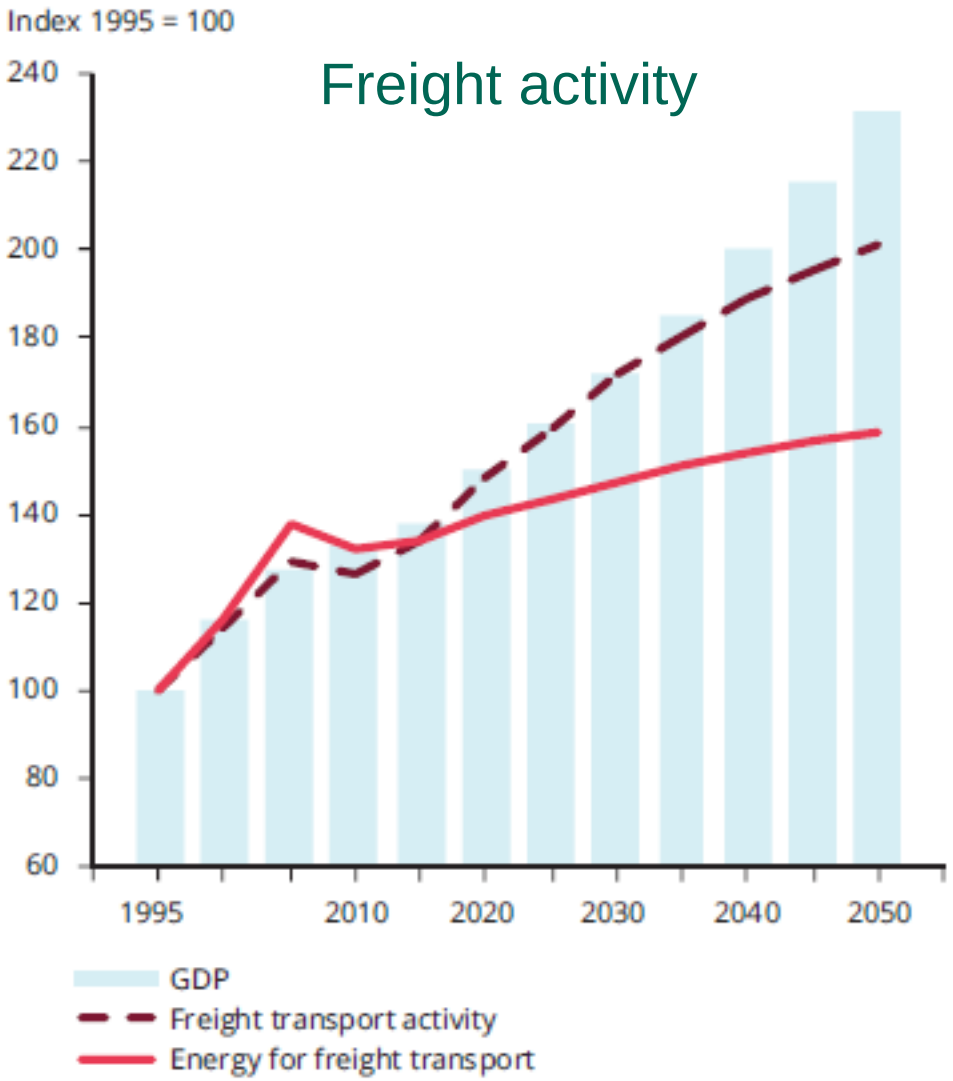
Efficiency gains haven't been sufficient in the past



Source: Odyssee database (Enerdata, 2014) and EC, 2014

And efficiency gains won’t be sufficient in the future

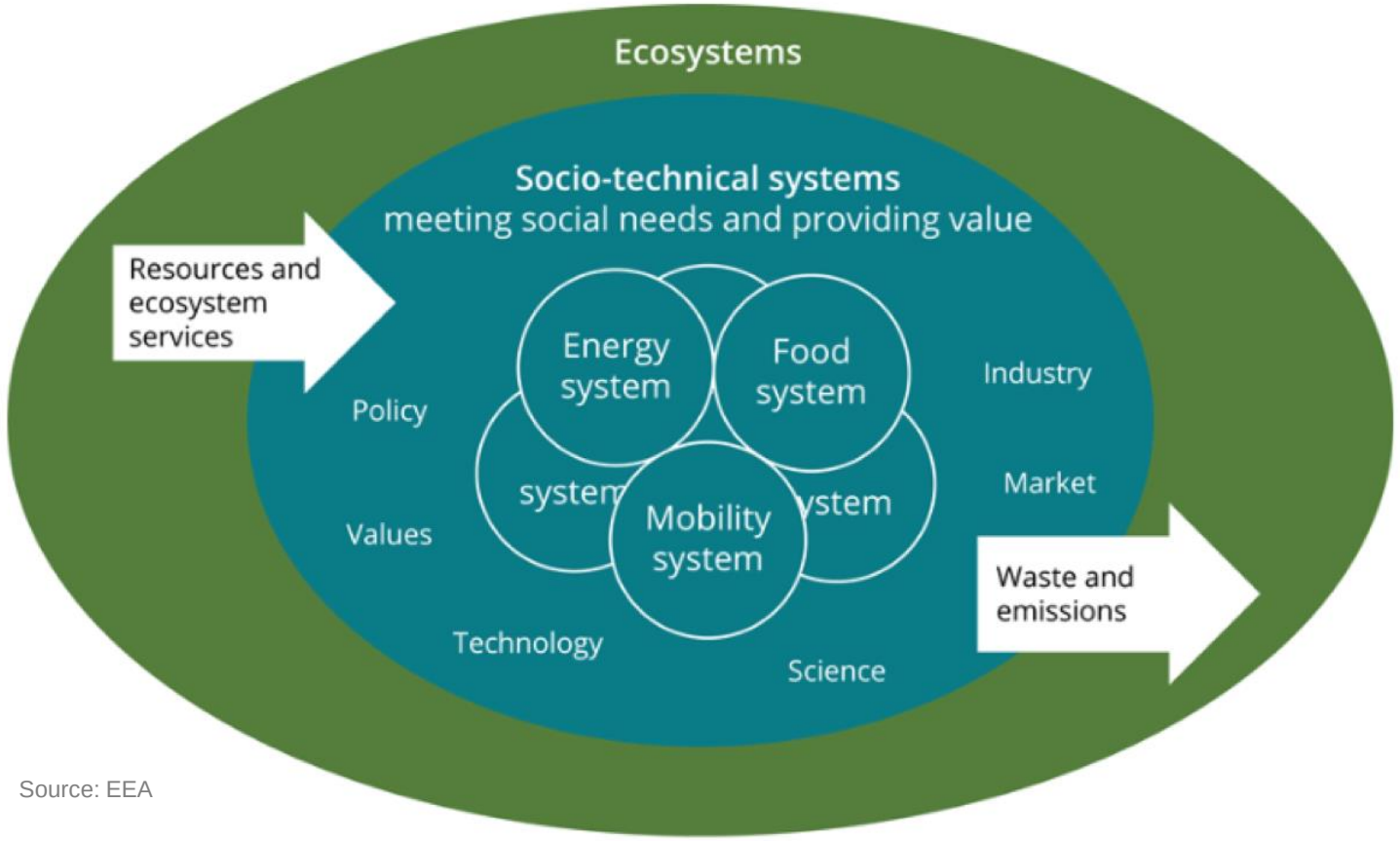




Source: European Commission Reference Scenario 2016

Systemic challenges require systemic solutions

Second, because the co-evolution and interdependence of technological and societal systems creates lock-ins, feedbacks and trade-offs, implying the need for a systemic perspective.



Source: EEA

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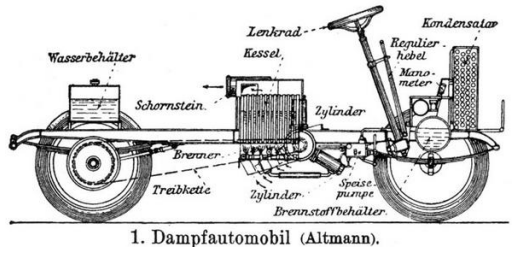
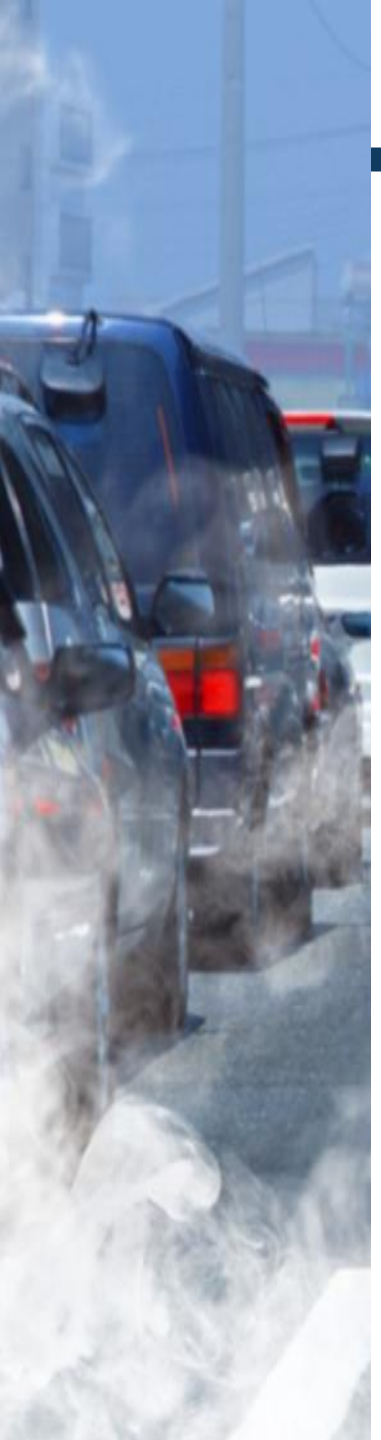


1. Dampfautomobil (Altmann).

Understanding the socio-technical perspective

- Technology researchers emphasise the idea of the ‘dominant design’: one design gets an initial advantage and becomes very hard to displace
- E.g. the petrol powered internal combustion engine
- Once dominant design is established, innovation shifts from products to processes – from radical to incremental improvements



Business incentives entrench the dominant design

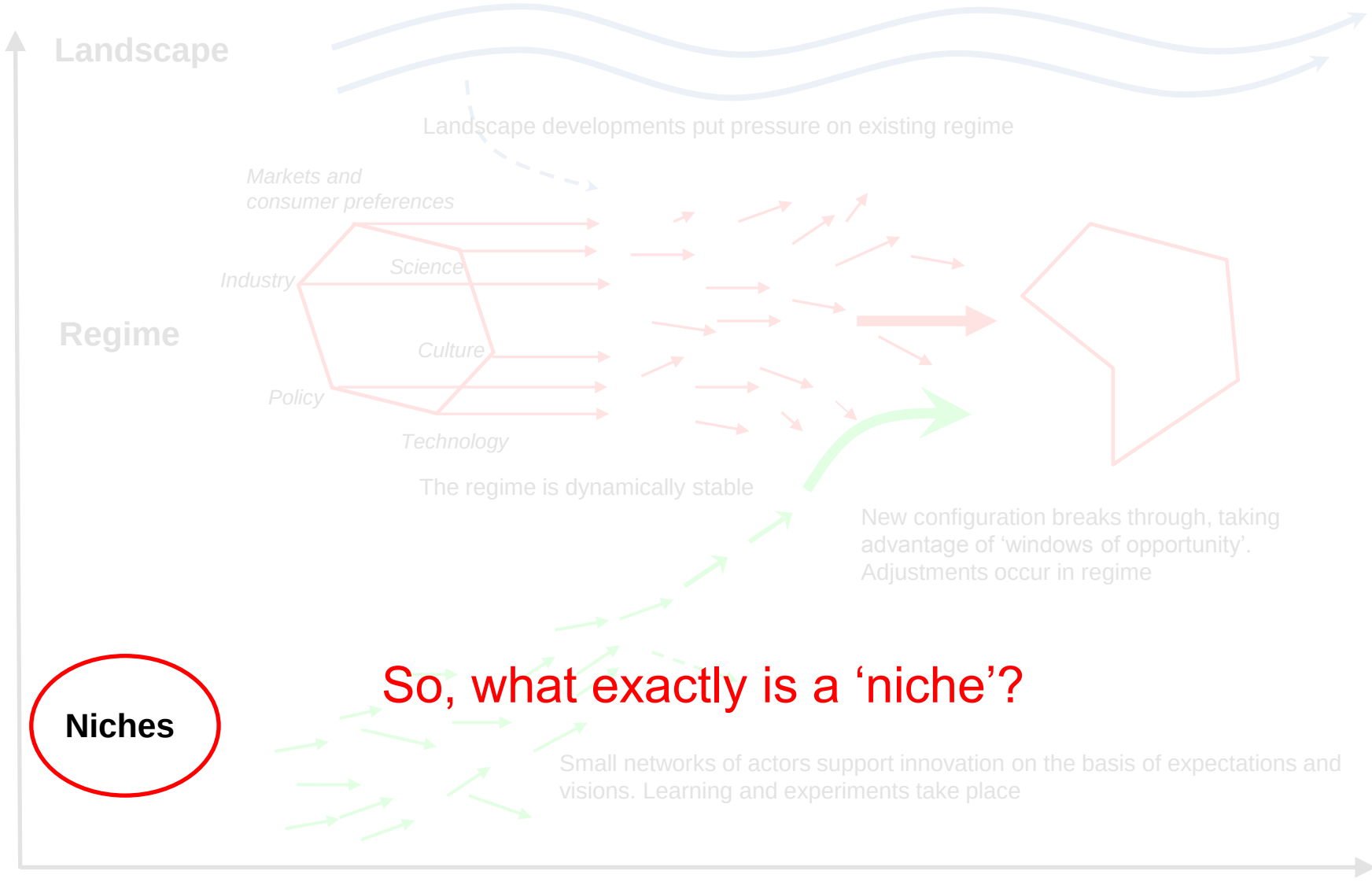
- Industries consolidate, make large and irreversible investments in plant, and restructure themselves, develop knowledge and skills around the dominant design.
- Most business investment is financed from recycled revenues and profits, favouring incumbent production.
- Industry networks form producing inputs or complementary infrastructure (some long lasting).
- Government standards provide coordination (removing uncertainty) but lock in aspects of the dominant design. Altering taxes and subsidies creates winners and losers.

Social systems further entrench the dominant design

- Private institutions emerge reinforcing lock-in: technical schools, professional bodies, workers unions, user associations
- Social practices co-evolve as technologies become an integral part of daily life. E.g. residence, work habits, leisure, media, culture.
- This is why they're called 'socio-technical systems'.
- A huge range of incentives favour incremental improvements to the existing system. So how can societies overcome these lock-ins and enable systemic change?

Innovative outsiders hold the key to reconfiguring systems

The multi-level perspective on transitions



A niche is a small protected space

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How and where do niches emerge?

A niche is often defined as a space protected from the dominant regime, affording innovators opportunities to implement and experiment with new technologies, processes or social practices.

Niches can arise:

- Spontaneously via local heterogeneity (e.g. environment, culture)
- Due to civil society actions (labelling schemes, etc.)
- Within businesses (Xerox PARC, AT&T Bell Labs, Google, etc.)
- As a result of policy (e.g. tax exemptions, grants, investments)

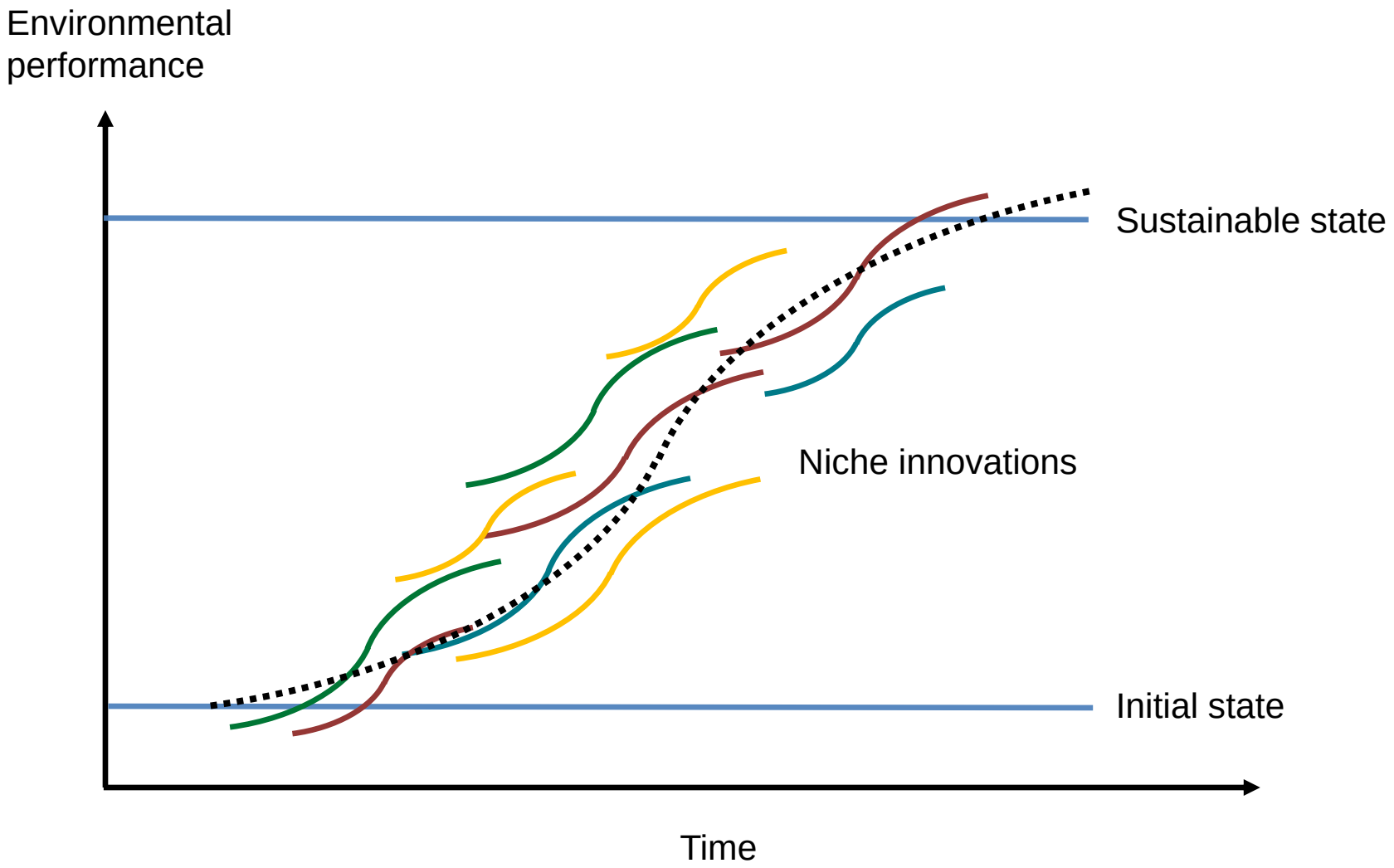
UTZ
Better farming
Better future

Climate Challenge Fund

European Environment Agency

UBER

Systemic change involve multiple innovations

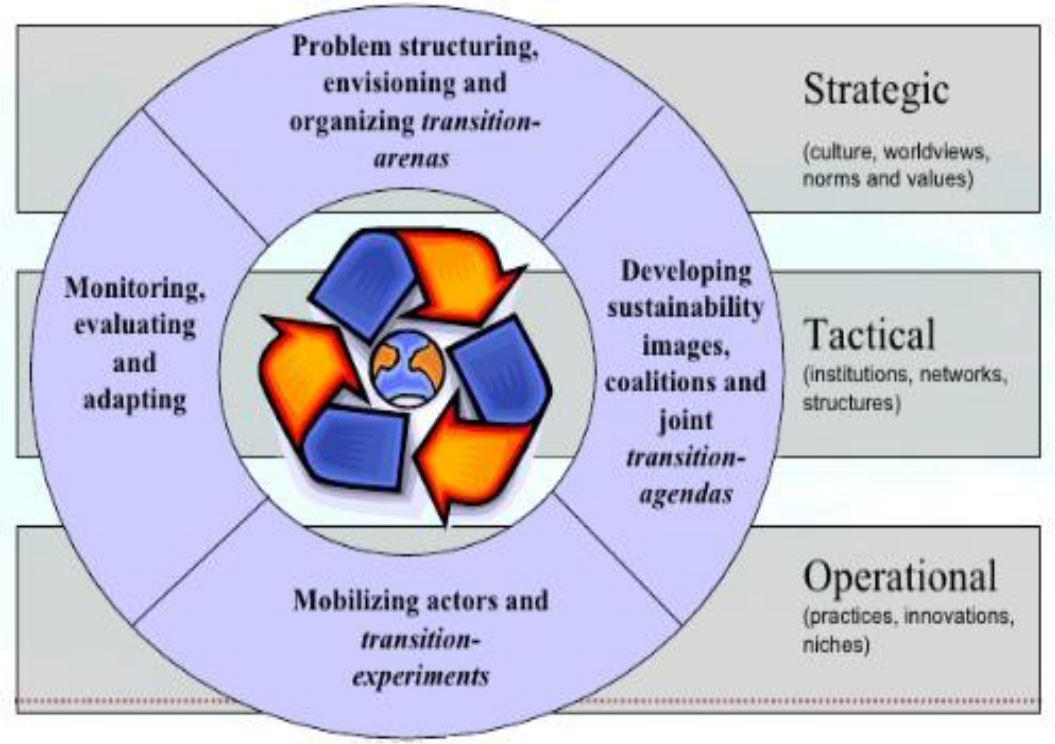


Source: Loorbach

Transitions are complex, uncertain, emergent processes

Transitions can't be managed in a top-down way. Approaches for governing socio-technical transitions therefore emphasise:

- Experimenting and learning aimed at aligning the technical and the social
- Iterative, adaptive, participatory processes of visioning, agenda building, experimentation and evaluation

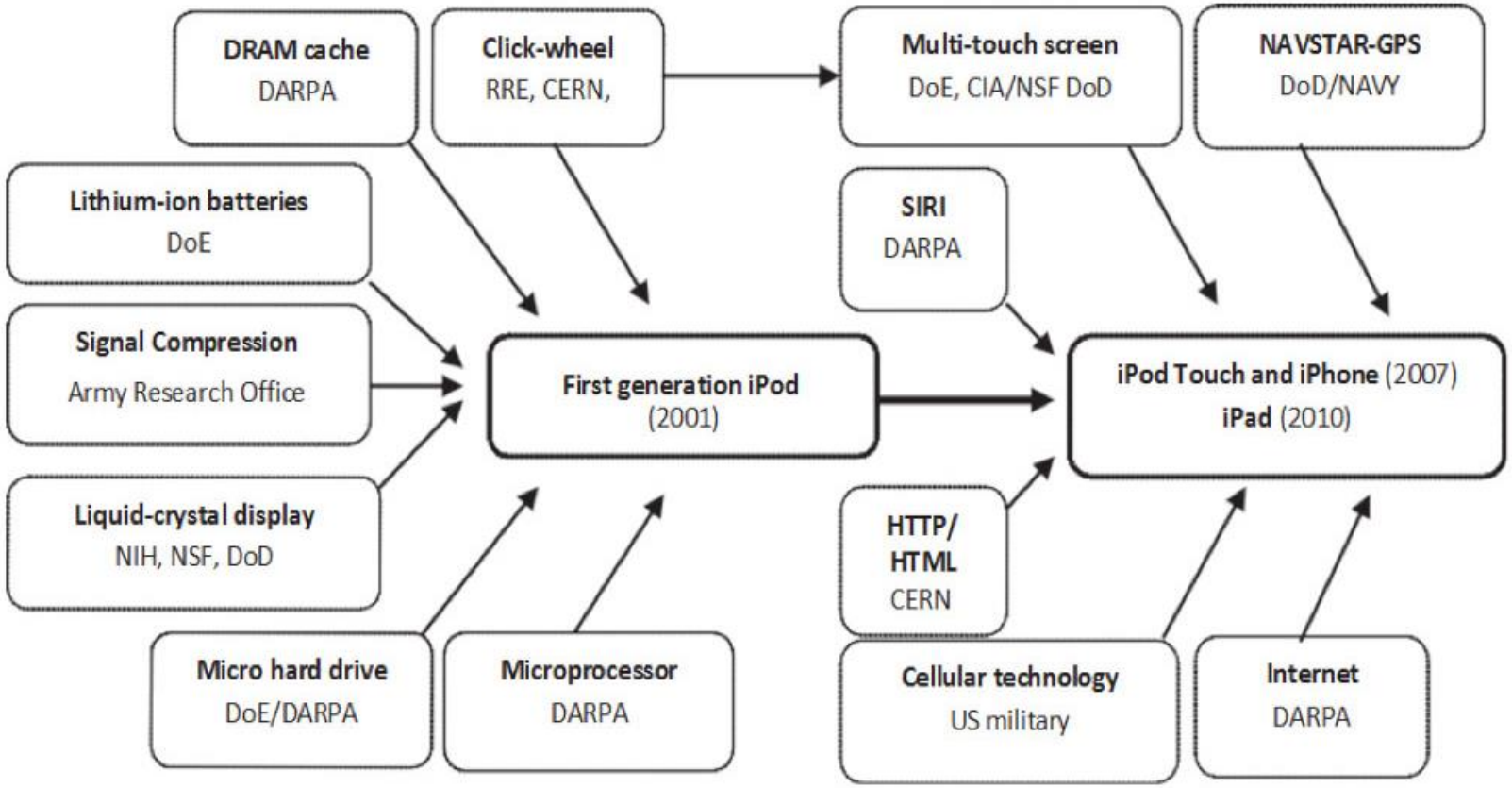


The socio-technical framework is just one approach

Socio-economic transformations

- Addressing the socio-economic paradigm: Polanyi and *The Great Transformation*: marketisation of society, impacts on human nature and values (consumerism, materialism).
- Social innovations aimed at creating alternative economies can enable a shift to sustainable lifestyles?
- Addressing socio-economic sub-systems: socially undesirable outcomes in finance, tax, welfare, labour, trade systems due to incentives, power, market failure
- Mixture of mainstream and innovative responses

Questioning the idea of market forces as the key driver of innovation



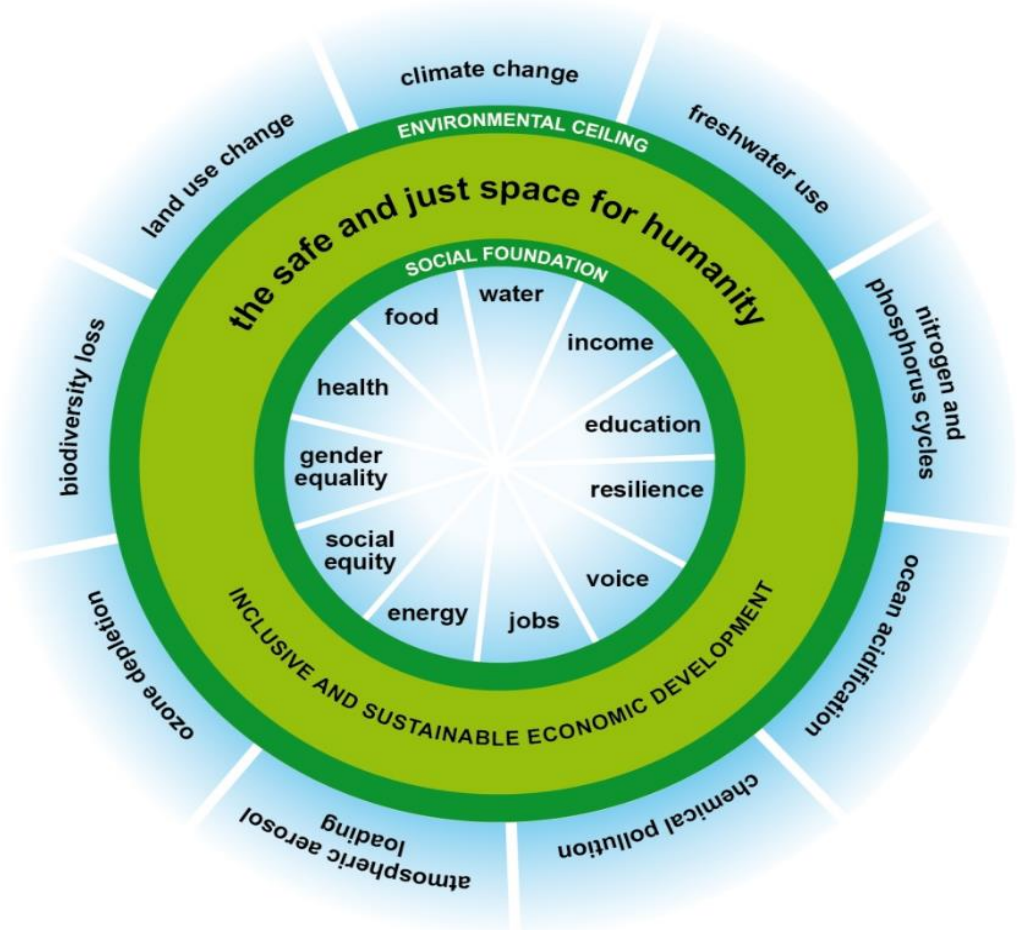
Source: Mazzucato

Socio-ecological transformations

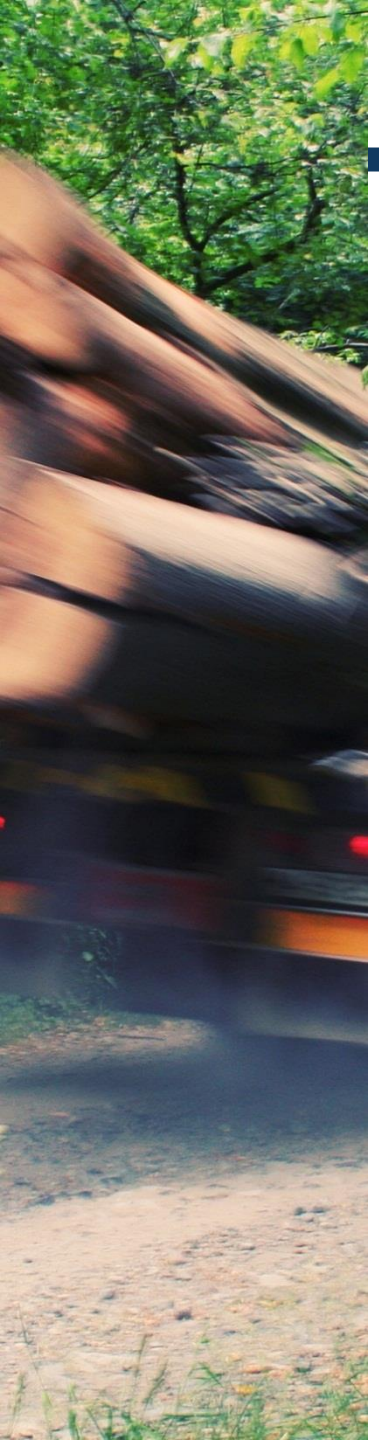
Starting point in

- global environmental change research (ecosystem resilience, planetary boundaries)
- nature-society interlinkages (the Anthropocene)

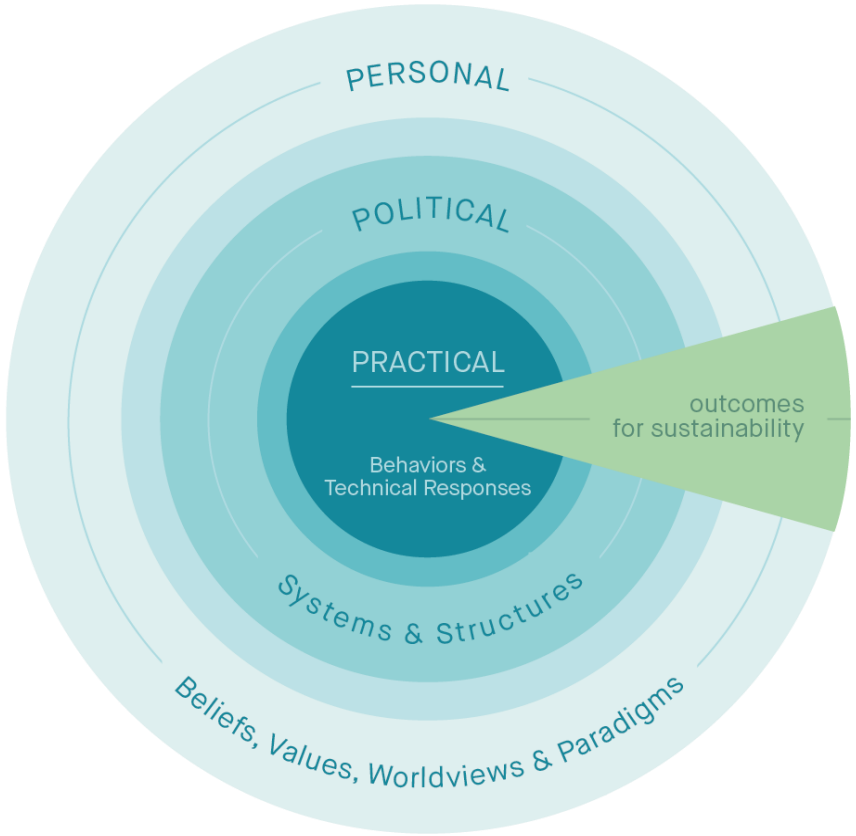
Focus on food and land use leads to emphasis on social innovation, with implications for dynamics of change (scaling up, out, deep, etc).



Source: Raworth

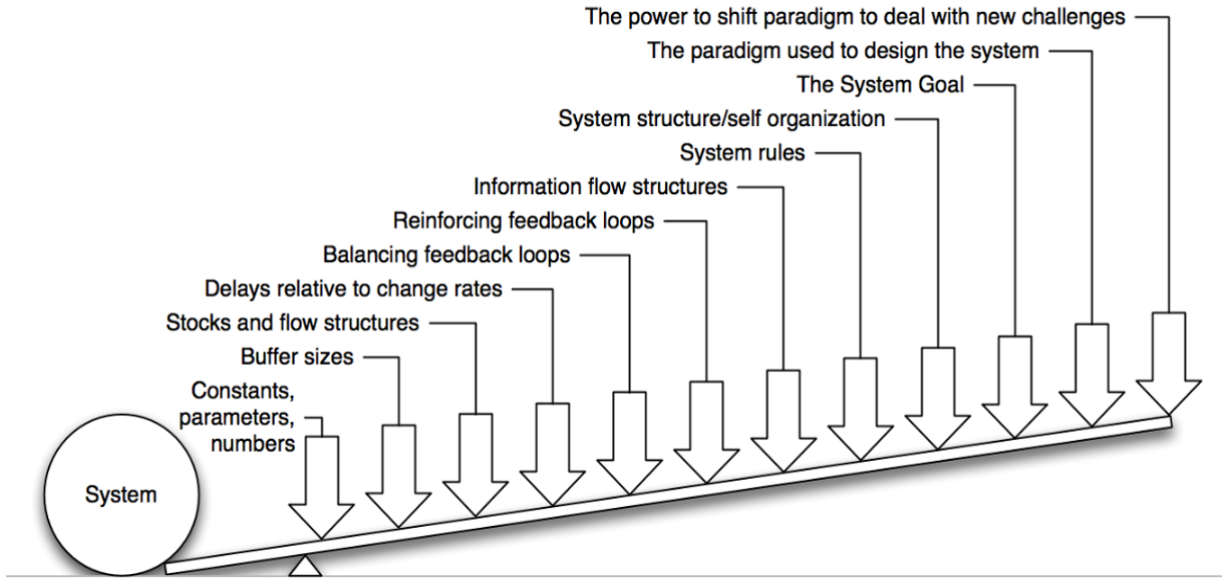


Leverage points for system change



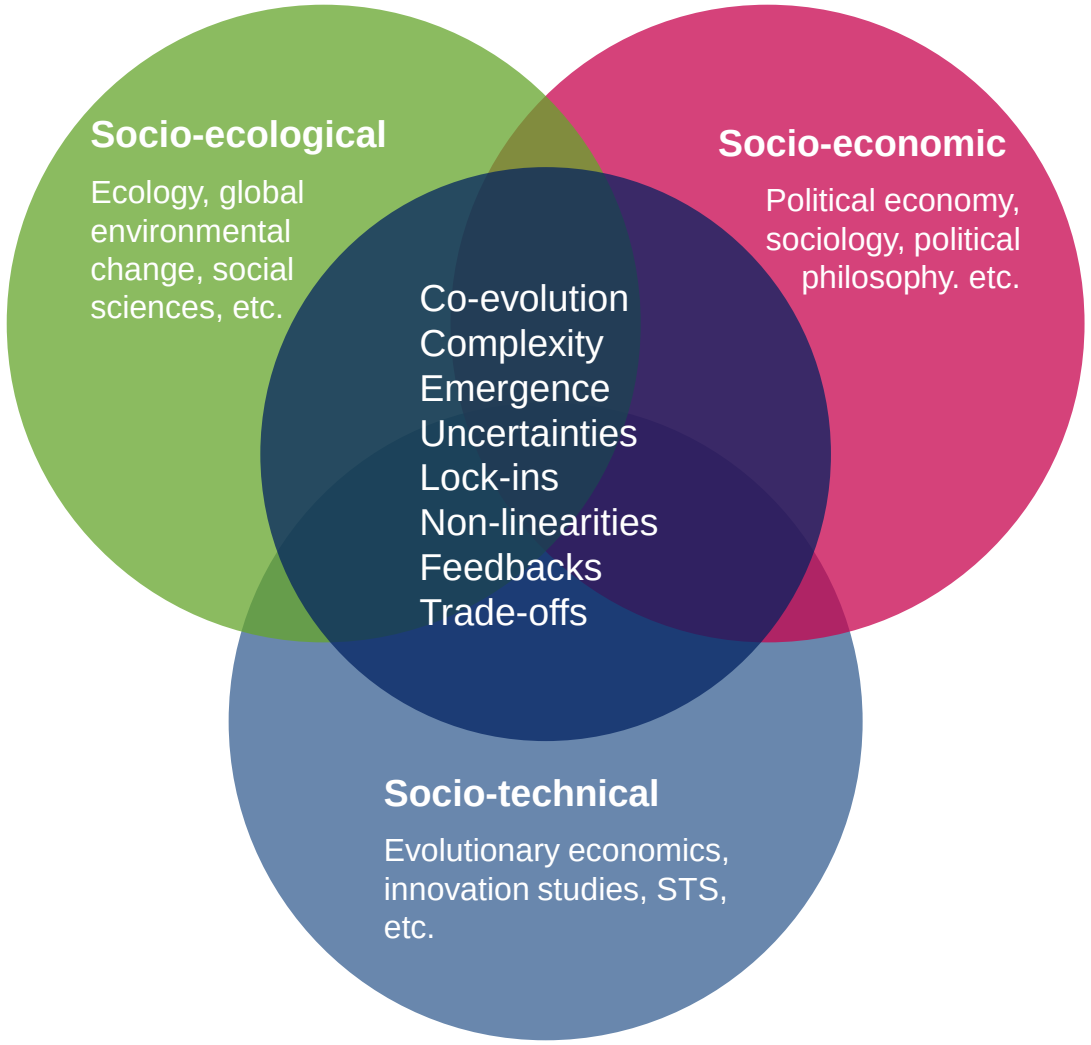
Source: O'Brien and Sygna

- Transformative activities can be organised into three spheres
- Transitions can seldom happen without transformations in beliefs and values.



Source: Meadows

Three analytical perspectives on systems

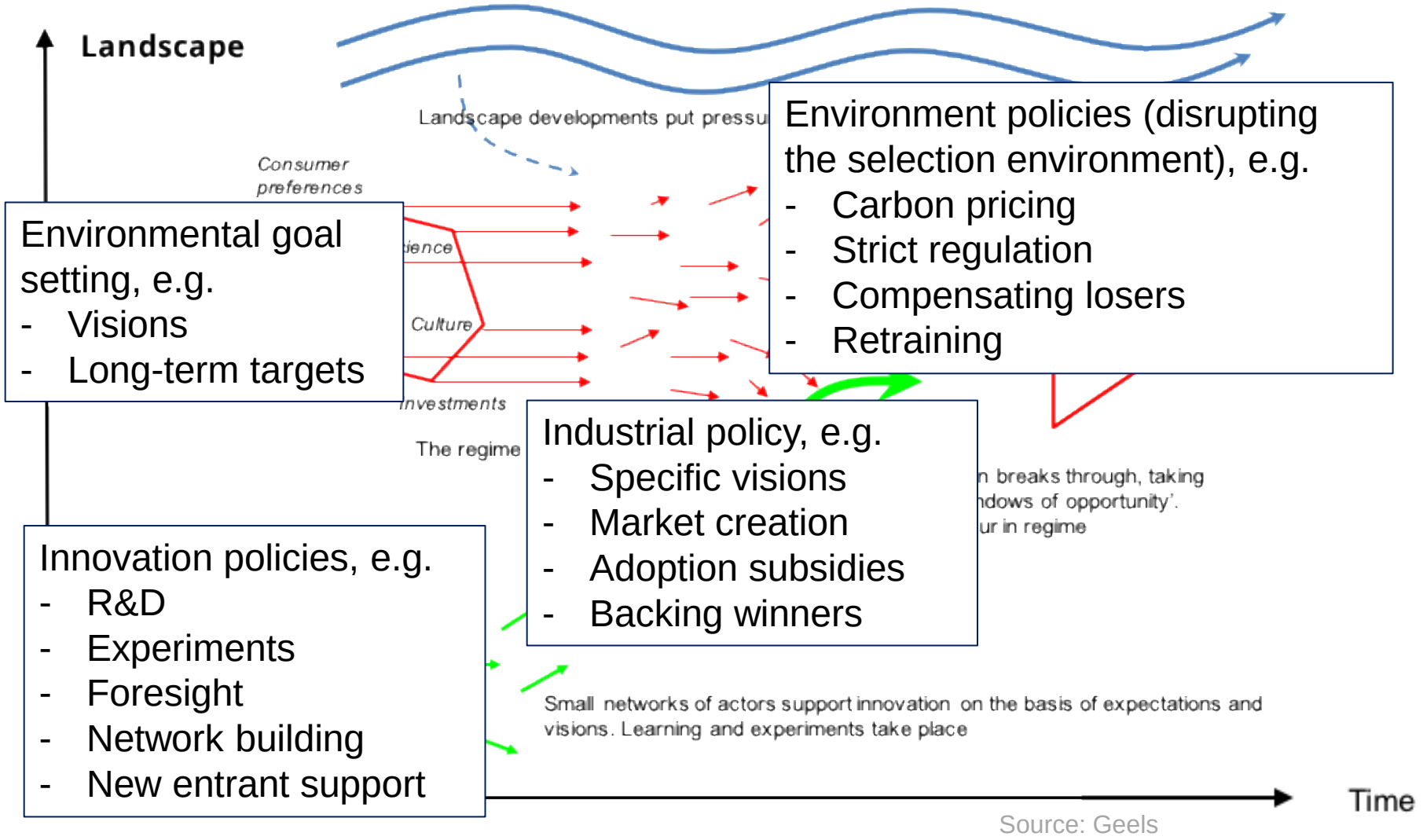


Source: based on Loorbach

Contrasting disciplinary roots and systemic focuses but co-evolution produces many shared characteristics

What does it means for governments?

Looking beyond environmental policy tools to complex policy mixes



Environmental goal setting, e.g.
- Visions
- Long-term targets

Environment policies (disrupting the selection environment), e.g.
- Carbon pricing
- Strict regulation
- Compensating losers
- Retraining

Industrial policy, e.g.
- Specific visions
- Market creation
- Adoption subsidies
- Backing winners

Innovation policies, e.g.
- R&D
- Experiments
- Foresight
- Network building
- New entrant support

Source: Geels

TERM 2016 points to diverse opportunities and co-benefits

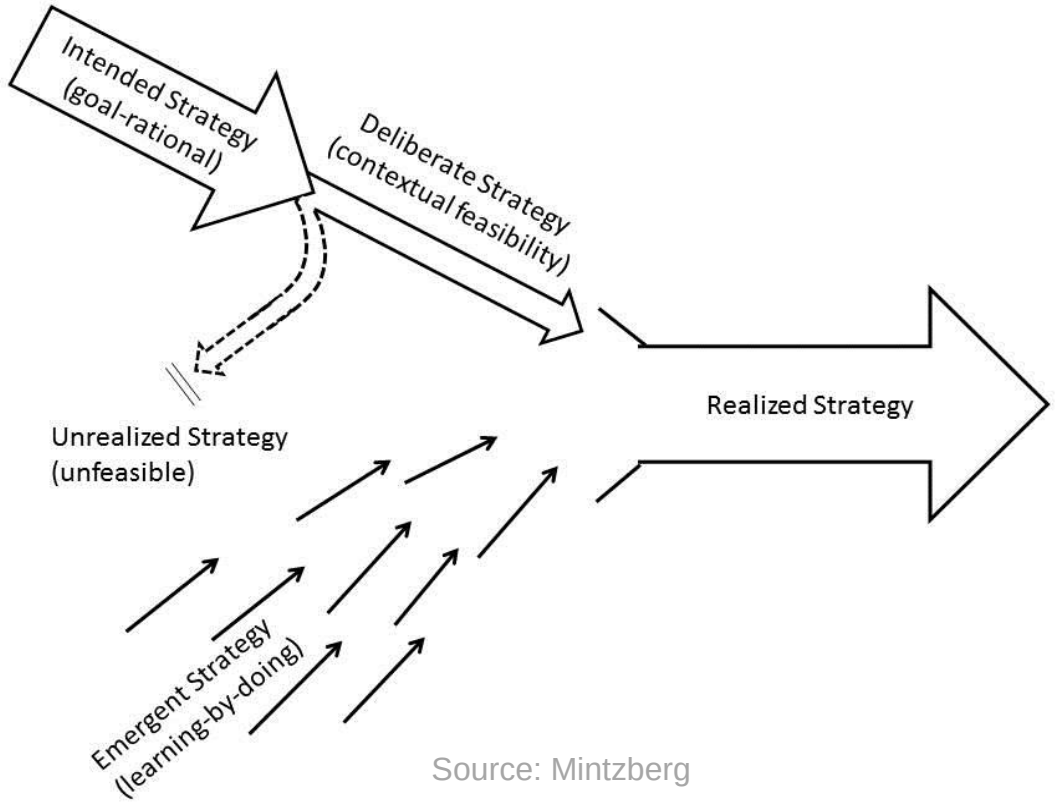
Image © EEA

- Changes in behaviour and preferences, specially in cities and younger generations.
- Awareness of air quality problems and willingness to change policies
- Non-motorised modes improve urban quality (air, noise)
- Varied forms of shared and automated mobility
- High speed train links and new freight corridors
- But how these play out in practice is uncertain (e.g. electric bikes, shared mobility)

Knowledge development, networks and learning

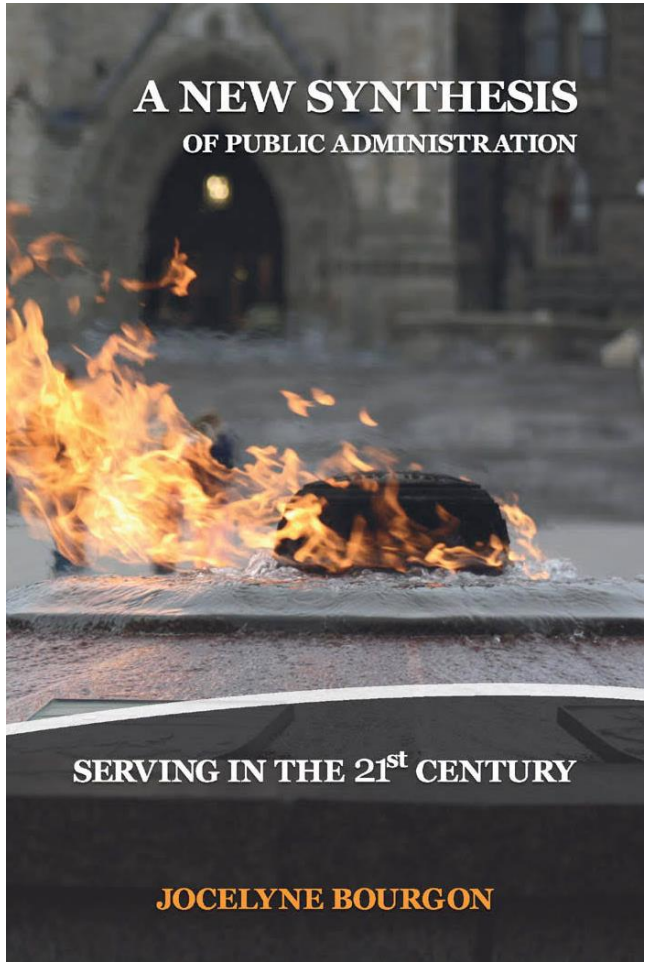
- Breaking down silos across government and across scales
- Enabling local experimentation (including in policy)
- Fostering networks for information exchange, learning (e.g. HINKU)

- Promoting transdisciplinarity and co-creation of knowledge
- Monitoring, foresight, modelling, social sciences, action research, etc. all provide insights



Source: Mintzberg

Public administration for the 21st century?



'The best insight about emergent phenomena may not rest with government. … Enabled in part by modern technologies, citizens and other actors can devise innovative solutions to public issues.

Governments need to leverage the power of others. The knowledge, capabilities and loci of action are broadly dispersed.'

Can we create institutions and networks that can enable societies to achieve sustainability transitions?